PLASTICS

A Periodical Devoted to the Manufacture and Use of Composition Products

JUNE, 1926

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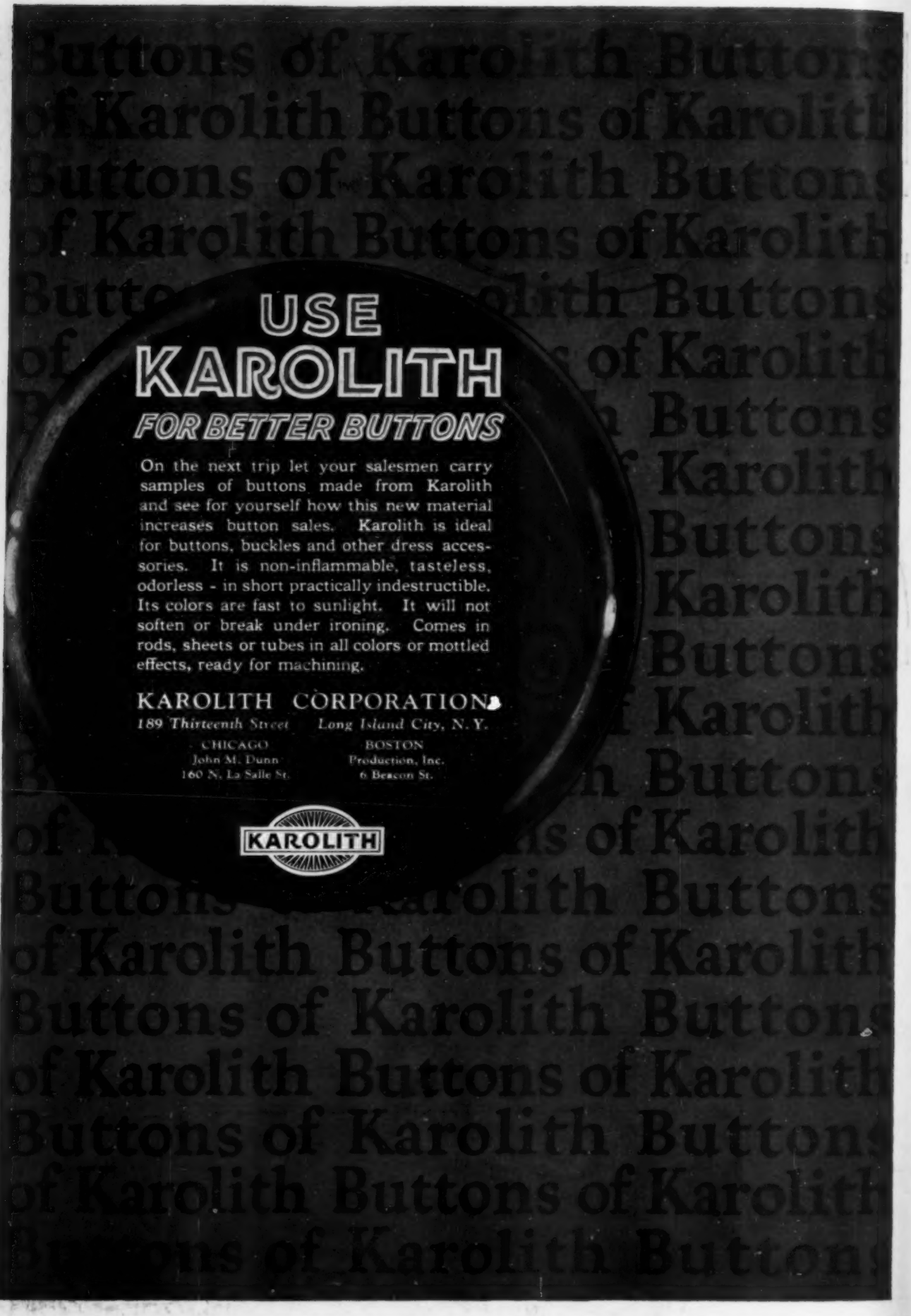
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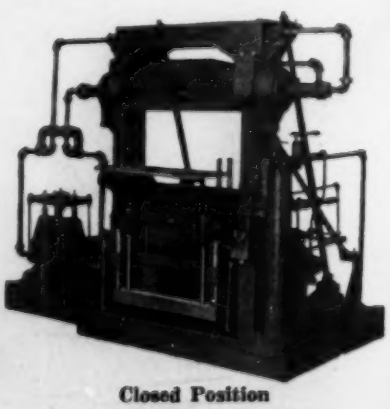

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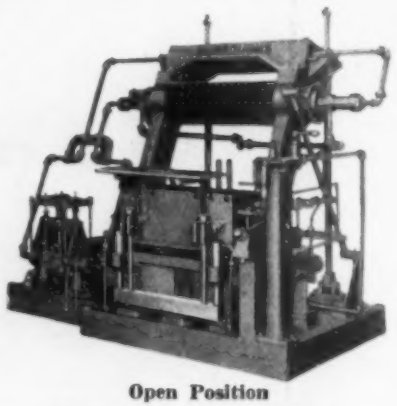

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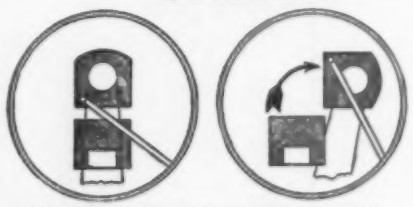
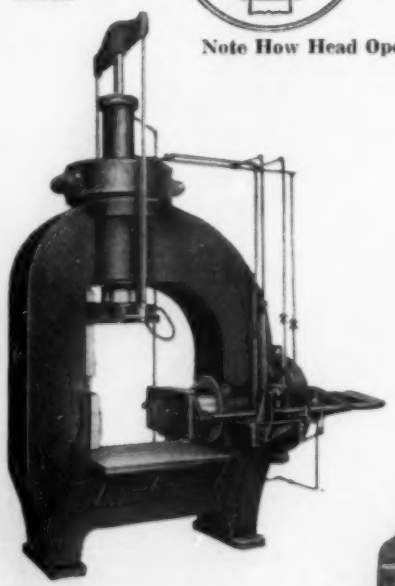


Note How Head Opens Like a Book



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IN this column in past issues we have talked about the function and duties of an industrial magazine. Now, one more constructive action has been conceived of, the discovery through a prize contest of new basic uses for the products with which we deal.

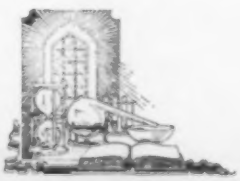
As you will see on turning to page 201, PLASTICS is offering $250.00 in a series of five prizes for new ideas for the practical application of any plastic material now on the market.

This contest is the culmination of a series of conferences with manufacturers and fabricators of plastic products. Every man consulted felt that there was an abundance of latent ability and many excellent ideas amongst the men at the bench or at the machine and that any independent method to bring these thoughts to the fore would be of real value to the industry.

The prize contest has proven in other fields one of the best means of uncovering many practical and marketable suggestions. An interesting feature has been that frequently these suggestions came from people who were never believed to have any bent towards invention or research or that intensively knew the industry. To reach the byways as well as the highways PLASTICS will seek publicity in as many other publications as possible and will advertise the contest wherever it will do the most good.

We believe that many interesting things will come to light and of course we trust that this will be the medium through which many new and worthwhile articles and processes will be brought to benefit the entire plastic industry.

The Publishers.



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Vol. 2 JUNE, 1926 No. 6

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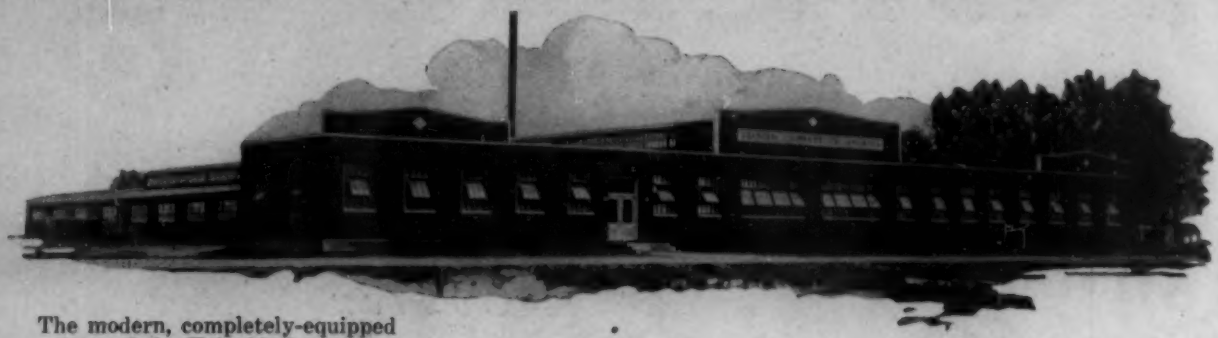

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PLASTICS

A periodical devoted to the manufacture and use of plastic and composition products

Vol. 2 JUNE, 1926 No. 6

Production of Electrical Insulation

An outline of the general methods of manufacture of molded products

By Werner Urbanus

From Kunststoffe 1925, 15, 189 and 209

This is a further installment of the interesting account of the fabrication of molded electrical materials, being continued from the May issue of PLASTICS

HAVING described the preparation of the molding powders and the mixing of fillers with the various binder agents, the author continues:

As a general rule, the various binders are most advantageously combined in order to yield products of the desired properties. In some cases certain artificial resins, such as Albertol, can be used in combination with natural binders, with excellent results.

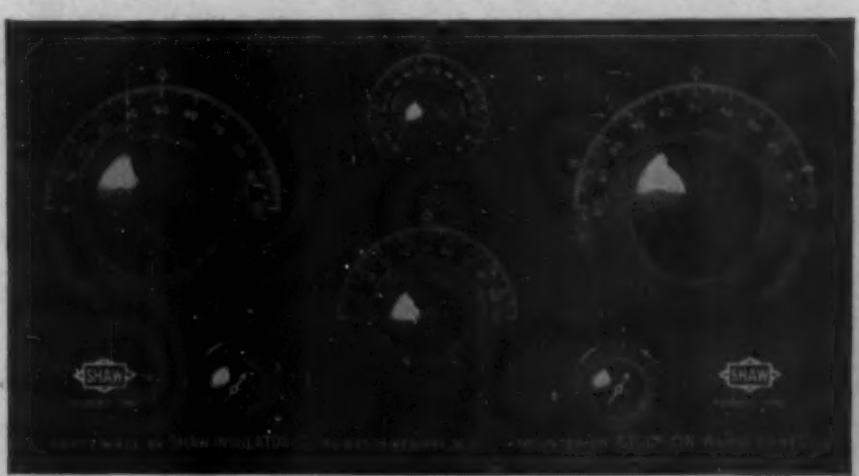
Among the fillers one of the substances must be a fibrous one, to help in holding the material together and to prevent its too ready fracture from mechanical shock. Asbestos fiber is especially valuable, followed by organic fibrous material, ground paper and the like. Cotton flock is used very widely and provides a cheap, efficient fiber filler.

Among the mineral materials, used mainly for their hardening properties, are asbestos powder, kaolin, talcum, heavy spar (barium sulfate or barytes), kieselguhr (infusorial earth), ground bricks, and wood flour or straw-meal.

The choice of fillers depends a good deal upon the use to which the material is to be put and the weight and specific gravity desired. One of the greatest advantages of the molded goods made from such natural fillers as just described, is their cheapness. Of course it should be obvious that for extremely good results, no cheap material should be expected to work as well as a more expensive one, but for many cases the cheap material is just as good.

For example, if the shape of the object, and the possible demands made upon it allow of the use of a cheap material, it must not be expected that the same filler and binder can be used for molding complicated and intricate parts which must withstand considerable mechanical strain. It is simply a matter of good judgment on the part of the manufacturer.

By using more expensive and harder binders, molded insulating products can be prepar-



Characteristic Radio Parts Amenable to Thermoplastic Molding

ed which will leave nothing to be desired as to hardness and resistance. High-grade jet-black pitches and asphalts, when incorporated properly with fillers, will yield molded goods of splendid appearance and high quality.

Heat Resistant Products

One thing that must, however, never be forgotten is this: all molded goods made from binders that are fusible, will soften with increase of temperature, and will be dissolved or softened on contact with any solvent which is capable of dissolving the binder. This leads to the consideration of molded insulating products which will be resistant to heat as well as to solvents.

To produce such insulating products, use is made of the hardenable resins, either artificial or natural. Among the natural products which are endowed with the property of becoming at least partially infusible on prolonged heating, there are shellac and tung oil (Chinawood oil). These substances will, either by oxidation or polymeriation, become partially infusible. However, they do not approach the artificial resins in this regard.

The artificial resins most suitable for the manufacture of electrical insulating material are usually condensation products of phenols and aldehydes. In general they are made by the condensation of phenol, cresol or naphthol with formaldehyde, or bodies yielding formaldehyde, such as trioxymethylene and hexamethylenetetramine. When first prepared most of these artificial resins are soluble in acetone or alcohol, but can afterwards be converted into insoluble and infusible resins. Some of these will withstand temperatures as high as 300° before they will sinter or carbonize.

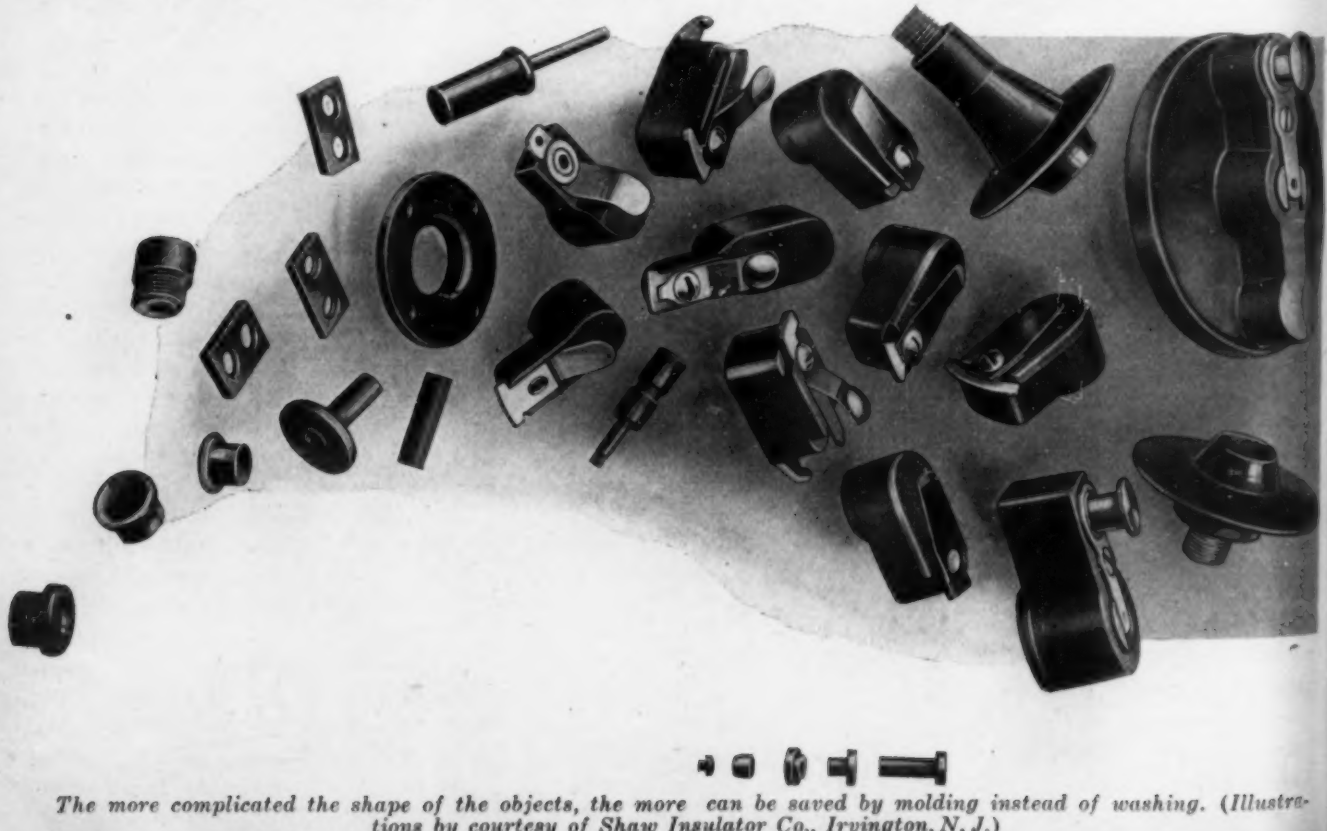
Advantages of Bakelite

This makes it possible to produce molded insulating material that will not soften with heat. The most characteristic, and perhaps the best known of these hardenable resins is Bakelite, named after its inventor, Dr. Leo Baekeland.

This Bakelite is furnished in a form known as Bakelite A, which is either liquid or solid, or is fusible by heat and soluble in alcohol and in acetone. On heating this product, it becomes converted into what is known as Bakelite B, which is still plastic, but no longer soluble and not really fusible, only softening on being heated. Further heating will convert this product into Bakelite C, which is completely insoluble and infusible. As the change from Bakelite B to Bakelite C is usually accompanied by the evolution of gases, and as this would render the material frothy and full of bubbles, the final hardening is usually carried out in an apparatus known as a Bakelizer, and which serves to heat the objects under gas pressure, to prevent the porosity which would result from the free evolution of the gases formed by the transformation.

Hardening the Phenol Resins

The usual method is to mix the liquid or solid Bakelite A most intimately with the fillers and then to press the powder into suitable dies at from 160



The more complicated the shape of the objects, the more can be saved by molding instead of washing. (Illustrations by courtesy of Shaw Insulator Co., Irvington, N. J.)

to 170°C, which serves to convert most of the Bakelite into the B form. The pressed objects are then taken out of the molds and further heated in the Bakelizer under several atmospheres pressure for a few hours to 180°C until the complete conversion into Bakelite C has taken place. After such treatment, the objects are completely heat and solvent proof. Besides this they will resist moisture, acids and alkalies, and are very hard and tough and have unusually high electrical resistance.

Quick Molding Powders

Of course quite a number of modifications of Bakelite and similar artificial resins can be obtained. For example there are those which are so prepared that the change into Bakelite C takes place so rapidly that the objects when taken from the mold are already sufficiently hard. There are several other artificial resins which give good results. For example may be mentioned the Albertol resins made by the Chemische Fabriken Dr. Kurt Albert at Biebrich on the Rhine, Germany, and which are very popular in Europe.

Other Materials

A particular advantage of one form of Albertol is that it will allow of cold mixing, using a heavy mass of Albertol dissolved in alcohol and mixed with fillers. The objects are molded cold and have sufficient cohesion to be handled. They are then heated to 160°C for 8 to 10 hours to harden them. The possibility of using the product cold, enables very rapid and cheap production. Other hardenable phenol resins on the European market are Resinite, Condensite, Juvelith, Wenjacite and Faturan. In the United States the phenol resins, such as Condensite, Redmanol and Bakelite are all controlled by a single corporation, due to patent litigation in which the Bakelite was victorious.

Audion tube Sockets and binding-post strips are in big demand.

Cold pressed objects with large amount of fibrous material are obviously not so smooth in appearance as those having finely powdered fillers, and furthermore usually are characterized by the absence of the high polish that accompanies hot molding.

Celllulose Acetate

This leads us to the consideration of another binding medium which is naturally so tough and resilient that it makes all fibrous fillers entirely unnecessary, and which will yield smooth and highly polished pressed objects of great resistance and pliability, and the waste of which can be re-worked with good advantage.

Such a material is found in cellulose acetate. This material is quite similar in its properties to common celluloid, but with the added advantage of practical incombustibility and with very high electrical insulating properties.

There are quite a number of cellulose acetates, which differ from each other in solubility and in the degree to which the cellulose molecule has been broken down in the course of the acetylization. The general process of producing cellulose acetate consists in treating cellulose with acetic anhydride in the presence of certain catalysts.

The most suitable cellulose acetate product for the manufacture of molded electrical insulation is one known as "Zellite," which is soluble in acetone and is the result of the acetylization of a partially decomposed cellulose, namely hydrocellulose. The usual, chloroform-soluble form of cellulose acetate, such as the cellulose triacetate made from cellulose still having a large molecule, is not as suitable, and yields films and plates of considerably less pliability and strength than does the acetone-soluble product just mentioned.

Cellulose acetate is a white somewhat fibrous material, which on evaporating solutions of the same, leaves a transparent firm.

Plasticizers

The "Zellite" alone can be formed by pressing at 150 to 200°C into a brown, somewhat transparent hard mass, but which, due to its hardness and brittleness can not be used together with fillers. It only becomes amenable to use as a molding substance by the admixture of what are technically known as "camphor substitutes." These substances get their name from the fact that they are intended to replace camphor in the manufacture of celluloid, where the camphor has played a most important role ever since the discovery of this material. Camphor, unfortunately, is not as good a material for use with cellulose acetate as it is with cellulose nitrate. The main object of the camphor substitutes is to form a sort of "solid solution" with the cellulose acetate, acting as a gelatinizing or colloiding agent.

The number of substances proposed as cellulose acetate gelatinizers is very great and almost every factory works with

(*Continued on page 210*)

Dry Gelatin as a Plastic Material

Plates and pressed articles can be fabricated from powdered glue

From Kunststoffe 1926, 16,

GELATIN as a plastic material is not a new idea, but it is only recently that modern methods of manufacture have allowed of its use on a large scale.

A recent article on this subject, in Gunstoffe, gives a detailed account of the manufacture of molded articles from dry gelatin, the product being known as "Phanorite' in Europe. The following is a condensed account of the methods used in molding dry gelatin.

Raw Material

The raw material for the production of massive articles from gelatin must be either in powdered form or as so-called pearls, which have recently been offered on the market, the novelty of the new method lying in the complete absence of all moisture. A solution of gelatin is unsuitable for making plastic articles from gelatin, as the material, even if rapidly chilled to make it congeal will nevertheless require such a long time in drying as to make manufacture on a large scale out of the question.

Phanorite

Either pure gelatin, or for cheaper goods and where the color is not so important, common glue, is used, but even the small amount of moisture which the substance takes up from the air should be removed before attempting to mold objects. The main advantage of the "Phanorite" is that plates and rods made from the same will not warp as the material is so dense that it will have no tendency to moisture.

The gelatin is either suitably dyed or mixed with a colored or white pigment, as for example when imitation ivory is to be made. Two methods are available for forming the objects, either pressing or stuffing by extrusion. This method of forming articles has become quite common with cellulose acetate plastics.

The basic principle involved in the forming of gelatin plastic articles is that gelatin, even if dry, will become plastic when heated, and that under these conditions the individual particles will weld together to form a coherent and solid mass. "Phanorite" plates are made by pressing, the process being extremely simple. The powdered gelatin and fillers are placed within a steel chase lying on a flat steel plate, and a second plate is placed above the powder and pressure and heat applied, as in all plastic molding. By having the plates carefully polished, the finished gelatin plate will have a perfectly smooth and polished surface which requires no further treatment. On the other hand, if the plates are suitably engraved, a perfect reproduction of the design is possible. The sides of the chase are made removable so as to facilitate taking the pressed plate out of the mold at the end of the operation.

Aside from its use as a binder for the production of molded articles made from paper-mache and similar plastics, gelatin alone, or with inorganic fillers lends itself to utilization as a thermoplastic medium.

Operations can be considerably speeded up by having the press arranged for both heating and chilling. The plates or molds should be lightly greased or sprinkled with talcum to prevent adhesion of the gelatin.

Temperature Required

The temperature required is fairly high, verying from 170 to 200 deg. C (338 to 392 deg. F), but depends to a large degree upon the size and shape of the articles, and the nature of the particular gelatin used. Too high a temperature must be avoided to prevent burning the material.

Experiments are necessary to determine the proper amount of powder to mold any given object, as there is a considerable reduction in volume. It is possible by this method to produce gelatin plates from 5 to 10 mm. in thickness (1-4 to 1-2 inch), which is much greater than by the older methods involving the drying of gelatin solutions on glass plates. Comparatively simple objects can also be molded in presses, but for more complicated shapes and for highly ornamented pieces, methods involving stuffing or extrusion are preferable.

Other Means

The stuffing-extrusion method has been applied with great suc-

(*Continued on page 192*)

Proper Type of Packing Helps Sales

Leading manufacturers of molded electrical goods uses corrugated fiber shipping boxes

By H. H. Squire
of the Hinde & Dauch Paper Co.

IN THIS kaleidoscopic age, little remains stationary for long. The caravan of improvement moves continually and all that cannot move with it is either trampled under foot or left behind to die by inches in the Desert of Disuse. Along the march of progress, surprises have become commonplace; the human family absorbs the product of invention and discovery as a sponge soaks up water, and nonchalantly accepts, with slight and passing comment, wonders that would have overwhelmed our ancestors with awe. Yet with all its innovations, the sequence of improvement has been orderly and natural. Each development has created new human needs to demand the exercise of still more inventive effort. Thus, for instance, has the ubiquitous automobile invoked the genius of the road builder and inaugurated new departures in many lines of industry.

Harvey Hubbell, Inc., have found the above type of shipping containers to be both economical in storage while knocked down, and sturdy and weight-saving when full. At the same time the advertising matter on the boxes, and the display cartons stimulate the buyer's interest when opened out as shown.

Meeting a Need

Similar is the genesis of the corrugated fibre shipping box. The demands upon the shipping facilities of the past first suggested larger and stronger cars drawn in longer trains by heavier engines. These necessitated the installation of air brakes, automatic coupling devices and gravity switching tracks for the safe and expeditious movement of their heavy and unwiedy bulk and, in turn, the operation of these facilities imposed terrific shocks to be neutralized by the box-maker.

The result is the corrugated fibre box which has saved untold sums in packing cost and has so absorbed the shocks of transportation as to minimize the damaging of goods in transit. For many lines of shipping, the time-honored packing methods of a generation ago are things of the eternal past. Verily "The old order changeth, giving place to the new."

The plastics, industrial pottery and enameling trades are among the beneficiaries of this improved packaging system whose introduction has been quite general, in these fields. Harvey Hubbell, Incorporated, a leading manufacturer of electrical specialties and supplies, located at Bridgeport, Connecticut, is sponsor for the statement that, in carrying qualities, their corrugated fibre boxes are fully equal up to certain weights, to the heavy wood shook boxes in which Hubbell products were formerly shipped. This same firm goes on to cite the advantages realized through the change chief of which is the reduction of personnel in the box department, in which eighteen to twenty men were formerly employed but which is now operated with only eight. This economy, added to that of lower first cost, rolls up a handsome saving.

Nor are the major considerations of direct cost-saving and breakage insurance the only benefits accruing from this packing-reform which, although first enforced by the progressive demands of our transportation service, has long stood upon its own merits as a source of economy in operation.

Time Saved

A case in point is that of a large manufacturer of plastics, etc., whose shipping department reports a saving of 50 per cent in the time required for the preparation of a carload shipment, when this modern packing system is used. Another important by-product is storage-room saving which various manufacturerers estimate at from 40 to 80 per cent. Ease of handling and assembling the empty container effects other savings, while the comparative lightness of the filled package, the consequent reduction of transportation cost and the impossibility of robbing a corrugated fibre box without detection, benefit

(*Continued on Page* 194)

Railway Shipments of Pyroxylin Goods and Scrap

How to pack this material

IN CONNECTION with the article on the handling of pyroxylin scrap in the May issue of **Plastics**, it is interesting to note what the requirements of the American railways are.

There appears to be a divergence of opinion among the various railroads as to the comparative hazard of either finished goods or scrap. The ratings, as can be seen from the table reproduced below, differ in the Southern and Western roads from the official I. C. C. regulations and freight rates, scrap being put into the third-class in the official ratings.

However, all products take first-class rates. Occasionally a carrier will refuse shipments if marked celluloid, but will take them if marked toilet ware.

It is safest to inquire from your particular railroad what they expect. The following is a condensed account of what the various roads require in shipping cellulose types of plastics:

Pyroxylin Plastic scrap, inincluding celluloid scrap, fiberloid scrap, pyralin scrap, viscoloid scrap, zylonite scrap, or pieces of exposed or unexposed motion picture films, must be packed in lined wooden boxes complying with specification No. 17 (which states that wooden boxes must be lined with zinc or other suitable material), gross weight not to exceed 450 pounds; or in wooden barrels or kegs, complying with specifications No. 11, (with paper bags as inside containers of the scrap, and not over 55 gallons in capacity.)

Further Regulations

A yellow diamond-shaped label must be used to tag the package.

According to I. C. C. regulations, pyroxylin scrap is not to be classed as a dangerous article for freight shipments. In sheets, rolls, tubes it is classed as an inflammable solid for express shiments. But celluloid scrap—owing to its finely divided condition, is more hazardous than the original celluloid. It is classed as an inflammable solid by the I. C .C. regulations and is not generally accepted by steampship companies.

Ratings

	Official	Southern	Western
Pyroxylin Products	1	1	1
P. P. Scrap	3	1	1

Foreign Activity in Celluloid Increases

The Japanese celluloid toy industry is in such condition that it is capable of exporting large amounts of toys, especially dolls. Statistics recently published state that the export in 1922 was valued at 1.68 million yen, 2 million yen in 1923, 2.6 million yen in 1924, and 769,145 yen for the first three months of 1925, as against 506,539 yen for the same period in 1924. The products are shipped mainly to the United States, England, China, India, Africa and South America. Dutch Indies also took a considerable amount of the Japanese celluloid toys. The industry is practically localized around Tokio and Osaka, but none of the plants are very large.

France's celluloid trade with foreign countries was quite active in 1924. Importations amounted to 316.9 tons and 569.4 tons.

Neatness, strength and utility characterize the modern corrugated paper package

Proper Packages

(Concluded from page 193)

the jobber and the dealer and are potent builders of good will.

Better Appearance

The improved apearance of these boxes and their smoother surface, for the better display of trade marks and advertising, are added points in their favor.

These are major considerations which have led to the widespread adoption of "Corrugated" shipping boxes by the more progressive manufacturers of Plastics and allied lines. Many other industries already share with them the benefits and economies of the system and such is the adaptibility of the package that its use is rapidly extending.

Artificial Pearl Continues Popular

The Higgins process produces a more beautiful sheet than the older methods

By Carl Marx

THE past five years have witnessed a decided change in the design and appearance of most of the better grades of pyroxylin plastic toilet sets offered to the public. The advent of imitation pearl, while at first derided as a mere fad, has proven to be a very important factor in this field.

The sheer beauty of the material, especially when skillfully wrought into articles of elaborate design and harmoniously blended by the proper compositing of base and underlay, have endeared it to the heart of women of taste, like nothing ever before offered along similar lines.

While it is admitted that the idea of imitating pearls and mother-of-pearl is by no means new, it must be granted that all imitations made in the past have lacked that indefinable "something' that characterizes the new material. Somehow the older product looked too palpably "artificial."

Modern Progress

Real progress was achieved in this field as the result of long and painstaking research undertaken in the laboratories of Joseph H. Meyer Brothers, in Brooklyn, New York. Here for the first time on a practical, commercial scale, imitation pearl was turned out that not only matched the original pearl in appearance, but went it several points better, as it could be produced in a variety of colors that even nature had found impossible of achievement. Quite naturally it took a long time, and considerable financial outlay to achieve such results. Much of the credit is due to Mr. Edward F. Higgins, research chemist of Meyer Brothers, and the results of his labors and improvements are laid down in a series of United States Patents, most of which are still pending.

However, one of the patents was issued a little less than a year ago, U. S. Patent 1,539,084, May 26, 1925, application date June 24, 1922. This patent goes into considerable detail regarding the method of operation by means of which the imitation pearl product is obtained. The patent, while limiting its description to the manufacturing operations necessary when working with pyroxylin plastics, nevertheless is so drawn and claimed that it covers any other plastic material as well.

Imitation is the sincerest form of flattery. Rarely has a product that fairly revolutionized an industry been more highly flattered than the modern pyroxylin "pearl" sheet. The litigation arising from wide-spread imitation will prove interesting.

Hitherto imitation pearl plastic sheeting was made by coating the surfaces of transparent sheets, either colored or not colored, with the lustre giving pigment. These sheets were then pressed again into a block, and subsequently sheeted. The design was varied by cutting into various shapes, such as cubes or diamonds, etc., repressing and again sheeting. Or an alternative process was to produce the lustre giving material in the form of films made by pouring out a lacquer solution of the pigment and allowing to dry. These films were then placed alternately next to transparent (non-pigment) sheets, and the whole pressed into a cake and subsequently sheeted. Both of the above processes yield a sheet with the familiar laminated structure, that is to say, it is made up of strata of pigment bearing films with non-pigment bearing sheets, or veins of the lustrous pigment between transparent sheets.

Orienting the Pigment

The important distinction of the Higgins process, is the homogeneity of the mass of plastic; that is to say, the lustre giving material is thoroughly incorporated and distributed throughout the entire mass, and not imbedded in film layers between sheets. The Higgins process makes use of a novel procedure for orienting the lustrous pigment particles after they have been thoroughly mixed or kneaded into the plastic mass. This is done by forcing the plastic thru heated dies of special construction. This operation orientates the lustrous pigment particles, so that their light reflecting sides are parallel. These sheets are then placed indiscriminately in a press, welded with heat and pressure into a cake and later sheeted.

This patent has twenty-five claims, some of them quite broadly covering the process and some of them being directed to a particular feature of the invention. The other patents which are still pending are considered to be even more important, and they will without doubt prove interesting reading when they issue.

It appears that instant popularity which met this material led to considerable imitation on the part of other pyroxlyin

(*Continued on Page 203*)

Government Prohibits the Importation of Bakelite

Treasury Department decision is of importance to the trade

ACCORDING to a recent decision of the Treasury Department, the importation of insoluble and infusible phenol resins is forbidden, as constituting an infringement of the patents controlled by the Bakelite Corporation. The decision, which appears in "Treasury Decisions" for April 29, 1926, Vol. 49, No. 17, p. 7, reads as follows:

"Treasury Department, April 26, 1926.

The department has been advised by the President that the Bakelite Corporation, together with other firms, asks relief under provisions of section 316, Title II, Tariff Act of 1922, from unfair methods of competition in the importation and sale of certain articles made from synthetic phenolic resins, which are alleged to infringe the patent rights of the Bakelite Corporations product, which is sold under the trade mark "Bakelite."

By order of the President, dated April 22, 1926, copies of which were circulated to all collectors of custom on April 24, 1926, synthetic phenolic resins of Form C, and all articles manufactured wholly or in part thereof, except articles made by molding synthetic phenolic resins when mixed with other articles, are forbidden entry into the United States.

In the event that any such merchandise is offered for entry in your district, which, in your opinion, constitutes an infringement of the President's order, entry should be refused; and in the case of any shipment as to which any doubt of such infringement exists, you should submit a report thereof to the department for instructions, together with a sample. Signed L. C. Andrews, Assistant Secretary."

Molded Goods Excepted

It is evident from the above that this concerns mainly such hardened and insoluble resins as are employed usually for the manufacture of beads, umbrella handles, smokers articles and other translucent and transparent materal. We interpret the above as not including molded electrical insulating material, basing our opinion on the phrase "except articles made by molding synthetic phenolic resins when mixed with other articles."

As some of the early Bakelite patents expire at the end of this year, this decision may have to be modified later.

Duty on Plastics too low for Manufacturers

ACTIVE competition from abroad is one of the factors with which American fabricators of plastic material have to reckon. This is especially true in the field of pyroxylin plastics and casein solids.

Act of 1922

The Tariff Act of 1922 sought to minimize such competition by placing what was considered to be a high duty on all such products, but as this duty is being assessed on the basis of the foreign valuation, and not the American valuation, the actual protection to the domestic industry is practically nil. The provisions of the 1922 tariff act, including the revision of December, 1923, as relating to plastic materials are as follows:

Cellulose Solutions

Paragraph 30. Cellulose esters, collodion and other liquid solutions of pyroxylin, or other cellulose esters or ethers of cellulose, or of cellulose, 35 cents per pound.

Pyroxylin Plastics

Paragraph 31. Compounds of pyroxylin, or other cellulose esters or ethers, or of cellulose, by whatever name known, (except compounds of cellulose known as vulcanized or hard fiber) in blocks, sheets, rods, tubes or other forms, and NOT made into finished or partly finished articles, 40 cents per pound; made into finished or partly finished articles, 60 per cent ad valorem. *Provided* that all such articles (except photographic and motion-picture film) whether or not more specifically provided for elsewhere, shall be dutiable under this paragraph. (The duty on vulcanized fiber is 35 per cent ad valorem).

Casein Solids

Paragraph 32. Compounds of casein, known as galalith, or by any other name, in blocks, sheets, rods, tubes or other forms, not made into finished or partly finished articles, 25 cents per pound; made into finished or partly finished articles of which any of the foregoing is the component material of chief value, not specially provided for otherwise, 40 cents per pound plus 25 per cent ad valorem."

Foreign Competition

For many articles, this duty is insufficient to cause even an approximate leveling of the price to a point where American manufacturers can successfully compete. It is to be hoped that efforts to have these materials assessed at American valuation will be successful.

Why Destroy a Good Thing?

Competion based on inferior goods and price cutting ruins business for all concerned

By M. C. Meyer

An undercurrent of dissatisfaction is agitating the otherwise smooth flow of business in the pyroxylin plastics field. In an attempt to increase the volume of business, some concerns have adopted tactics that make it increasingly difficult for the more elaborately equipped fabricators to meet competition. This interview with a member of the firm of Jos. H. Meyer Brothers, voices the opinion of a number of leading manufacturers.

PYROXYLIN toilet sets are being actively consumed. The finely made mother-of-pearl effects in white and various other colors have attracted the purchasing public's interest and actually healthy buying for gifts and personal use.

Retail distributors are giving five or six times as much counter display space as they previously allotted to ivory, shell and amber articles.

Manufacturers of pyroxylin articles for the past few years have enjoyed the most profitable period in their history, up until the present time. Something of a serious nature has happened. Reliable fabricators of Pyroxylin articles are now complaining. "They are killing the industry" is the usual remark of the progressive manufacturer who tries to operate his plant at a profit.

Whom does he refer to as the "*killers?*" The manufacturer of articles who buys seconds from pyroxylin sheet manufacturer, or the manufacturer of pyroxylin sheets who sells seconds to the article manufacturer?

Recent investigations result in this finding. First quality mother-of-pearl pyroxylin sheets are extremely difficult to produce. Special knowledge of a high technical nature is required for each operation, which must be performed by competent workmen, skillful supervisors and under perfect operating conditions. One manufacturer of pearl sheets reports that they do not sell seconds but run them through their process again as scrap. Others, we learn, produce a majority of seconds which of course are sold to some manufacturers of articles at a very low price.

WHY DESTROY A GOOD THING? Competent diagnosticians always remark, "Find the underlying cause and we will have a chance to cure the disease." The Pyroxylin Fabrication Association has something real to discuss and act on. Clear off the smoke screens and get down to the cure. We cited the cause.

Interior Finish with "Duco"

"Interior Finishing with Duco" is the title of a short account on this subject in the April issue of the DuPont Magazine, by George Baldwin. The use of this enamel in decorating the exclusive Kurzman shop at Fifth Avenue and Thirty-sixth Street, New York City is described and illustrated. The total surface finished was 35,000 square feet, there being two coats on the ceiling, and one on the walls. Total consumption of lacquer, including that needed for the trim and furniture, was fifty gallons of tinted Duco and fifty-five gallons of thinners, all the work being done with spray apparatus, without in any way interfering with the business routine of the shop, as the work was done at night. The rapid drying of the enamel made "Fresh Paint" signs unnecessary.

Another New Word

It appears that there is a real danger that the English language is going to absorb the word "*Duco*" like it apparently has accepted "celluloid.' A patent granted Feb. 16, 1926, (U. S. P. 1,573,168) in its claims uses the word as though it were a common noun.

It would be interesting to see what a court would hold "duco" to be, if this patent should ever get into litigation.

Casein Plastics

According to a carefully compiled table prepared by an American manufacturer of casein plastics, the following amounts of raw casein plastics, in the form of sheets, rods and tubes, etc., were imported into the United States in the past three years.

Germany, 1923, 68,041 lbs.; 1924, 141,642 lbs; 1925, 27,487 lbs. First three months of 1926, 7,582 lbs.

England, 1923, 28,558 lbs.; 1924, 90,519 lbs.; 1925, 48,044 lbs. First three months of 1926, 7,396 lbs.

France, very small amounts, a few hundred pounds for the entire period.

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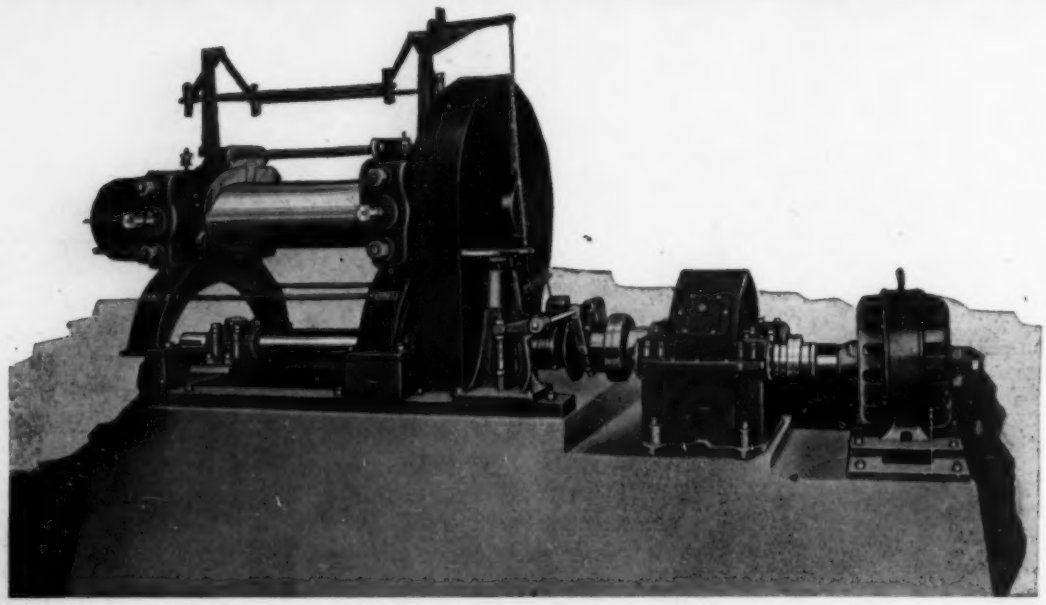

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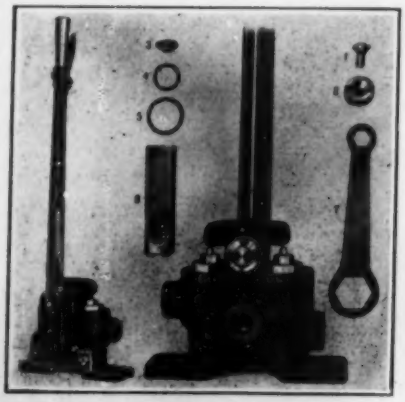

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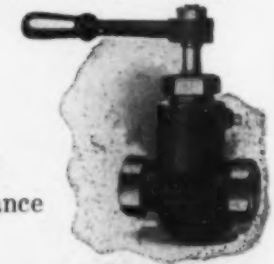

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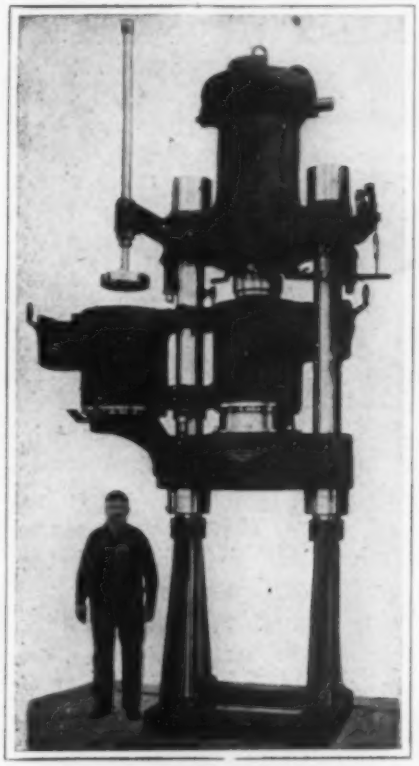

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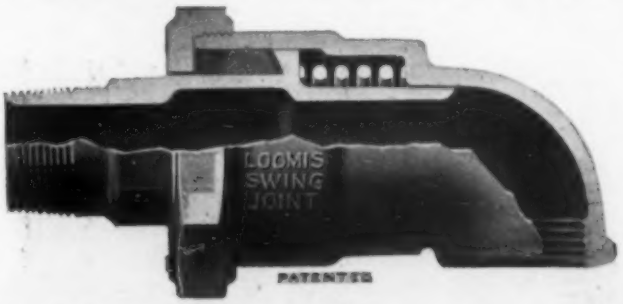

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EDITORIAL · IMPRESSIONS

Seconds, Competition and Worry

DESPITE the objections raised at the meeting of Pyroxylin Fabricators Association last fall, the use of seconds for the fabrication of combs, mirrors, brushes and other fittings of pyroxylin plastic toilet sets appears to be on the increase rather than otherwise.

This is to be deplored, as it gives rise to a form of competition that oversteps the limits of fairness. Obviously the reliable manufacturer who is doing his best to keep up the standards of trade by producing only the best possible materials, and who expends sufficient time and labor upon the products to make them well worth the price asked, can not compete against the unscrupulous fabricator who, operating perhaps under a very small overhead, and with seconds (and worse) bought up at a song, undersells him to such an extent as to render a comparison of the products impossible.

But there is another and even more serious side to this problem. The user of seconds and other inferior material actually spoils the business not only for the reliable manufacturer, but for himself as well. The purchasing public can be hoodwinked into buying material "at a price" perhaps for a short time, but sooner or later the inherent defects in the second class material become manifest and as a result the customer becomes convinced that not only has he been taken advantage of, but that in all probability all of the material of this nature is "no good." As a result he refuses to purchase other goods of the same type, even though made from the best material with the most meticulous care.

The manufacturers of the raw material are partly to blame. The nature of pyroxylin plastics is such that there is no insurmountable difficulty in reworking such materials as are not up to standard. The other alternative is for the fabricators themselves to accept a certain amount of seconds along with the perfect stock, and to work these up into an accepted line of merchandise for which such seconds are perhaps suited. This was suggested at one of the meetings held early in the career of the Fabricators' Association, the percentage suggested being not over fifteen per cent. A representative of the manufacturers stated that this about equalled to production of seconds, and would absorb all of them so that there would be no accumulation of this material, which quite evidently had to be turned into cash or taken advantage of some way.

Much remains to be done to clear up this situation. Only by a frank discussion of it can any solution be found. We know that many of our readers hold very strong opinions on this subject. They can do the whole industry a great service by "speaking out in public."

The Why of the Contest

IT might seem at first thought that materials as widely known as the various plastic products, many of which are extensively and nationally advertised, had in all probability found application in every conceivable use. However, the increasing complexity of modern life and the unprecedented onrush of new inventions must continually open new fields for the utilization of these universal materials.

PLASTICS, believing that there are countless other uses possible and that a great future for these products looms up ahead, offers a series of prizes for new and practical applications beginning with this issue.

It is felt that this will be productive of many valuable suggestions and will be of far reaching help to the entire industry.

Every one that has been consulted about this prize offer is enthusiastic over its possibilities for arousing interests both among the men who naturally incline to research work as well as among those whose vocations keep them at the bench or machine.

Even to the Pole

It is interesting to know that the plane flown by Lieutenant Commander Byrd as he crossed the North Pole, contained a pyroxylin Plastic material.

PLASTICS

The wind deflector in front of the cock-pit was made of clear transparent celluloid which had been furnished by a prominent American manufacturer. This was sold by them direct to the Atlantic Air Craft Company of Hazelton, N. J., who built the Fokker Plane used by Byrd in this epoch making event.

Contest's First Entry

Alfred Lalonde, called the celluloid burglar, pleaded guilty to entering a Park Avenue apartment by forcing a burglar-proof lock with a strip of celluloid.

As far as we know this is the first time that celluloid has been used for such a purpose. Sort of anticipating the contest.

$250.00
in prizes for ideas

WANTED: NEW USES FOR PLASTICS

PYROXYLIN PLASTICS, PHENOL RESINS, CASEIN SOLIDS, SHELLAC OR OTHER PLASTICS

Have you an original practical idea for a new use of plastics? Your suggestion may win one of the five prizes.

PLASTICS is going to pay $250.00 in prizes to five men or women in exchange for new ideas. Why not be among them?

We are holding this contest in an effort to uncover original ideas for the use of all manner of plastics. These ideas will be given to the trade at large as soon as the prizes have been awarded.

The employment of pyroxylin-plastics in the making of fountain pens, for example, was a new and practical development. You may have in mind dozens of similar suggestions for new uses of these versatile materials. Any one of them may win a prize.

Everyone is eligible,—clerk, executive, bookkeeper, foreman—everybody. Send all the suggestions you have;—the more you send, the more chances you have of winning. The only restriction is that if your suggestion has ever been applied to that particular plastic it cannot win a prize.

The prizes will be as follows:

1st - -	*$100.00*	*3rd - -*	*$50.00*
2nd - -	*50.00*	*4th - -*	*25.00*
		5th - -	*$25.00*

This contest is open to all. There are no strings tied to it; you do not have to be a subscriber to PLASTICS. All entries must be delivered at the office of PLASTICS by noon August 15, 1926. The names of the winners will be published in the September issue.

Your suggestion will be judged solely on its merit, originality and practicality. No thesis or letter is necessary. However, the more detailed the description, the easier it will be for the judges to pass on its merits. If necessary, attach a sketch or drawing.

Prizes will be awarded according to the following conditions:

The use suggested must be new; that is, never before made in the plastic product suggested.

Its practicality.

Its human interest or need.

Its ease of manufacturing.

Its marketability.

Rules Governing Idea Contest:

1. All suggestions must be in the hands of the Contest Editor, PLASTICS, 461 Fourth Avenue, New York, August 15, 1926.
2. More than one idea may be submitted by a contestant, but each idea must be on a separate sheet bearing contestant's name and address.
3. Everybody, whether connected with the plastic industry or not, is eligible for an award.
4. All ideas submitted will be passed on by the three judges. Their decision will decide the respective prize winner.
5. In case of a tie, the full prize will be awarded to both contestants.
6. Name and address must appear at the top of each sheet.

JUDGES FOR IDEA CONTEST—

Hugh E. Agnew, Professor of Advertising and Marketing Research, New York University.
M. Hanenson, former President, The Piroxloid Products Corporation.
Carl Marx, Editor of PLASTICS.

Write out your ideas and mail them to-day to

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Pasting Celluloid on Paper

A reader of the German publication, Die Celluloid Industrie (Gummi-Zeitung) requested information from that journal regarding the best method of attaching strips of pyroxylin plastic material to sample cards. He stated that the usual pastes were entirely useless as the material would fall off the cards.

Another reader, who signs himself A. J. replies to this query (Gummi-Zeitung, 1926, 40, 1073) as follows:

"Celluloid being a non-porous material will not allow of the use of ordinary adhesives. In order to fasten this substance onto paper, some liquid which will exert a solvent action upon it is essential. Such solvents are: acetone, glacial acetic acid, alcohol and the like. To fasten celluloid to paper, the following procedure will be found most suitable:

A solution of some camphor in alcohol is prepared, and the paper (not the celluloid) is passed through this solution, and allowed to become almost dry. The still damp paper is then placed under a toggle press on a flat surface, the piece of celluloid to be fastened on the paper is placed in its proper position, and the lever brought down. It is best to have the upper surface of the platen of the press heated, as it will cause the celluloid to adhere much better.

A few seconds pressing suffice to evaporate the alcohol and the celluloid and paper will be found to have been tightly welded together. For treating the paper, the alcohol camphor solution is best placed in a shallow metal tray."

Magnesite Cement as a Plastic.

See July issue of PLASTICS

Artificial Pearl

(*Continued from page 195*)

plastic manufacturers, and as a result of this Jos. H. Meyer Brothers have instituted suits against two plastic manufacturers for alleged infringement of the Higgins patent.

It is not known at present when these law suits are to be tried, but it can safely be assumed that much matter of interest to the plastics industry will be brought forward at that time. It is the intention of this journal to keep in close touch with developments in this case and to keep our readers informed of the situation in the form of impartial reports as to such parts of the proceedings as bear upon the chemical and manufacturing side of the controversy.

DO YOU KNOW—

—that in 1888 there were only 4 manufacturers of fountain pens.

—that in 1923 the number of manufacturers increased to 277.

—that in 35 years the output of this industry jumped from $104,000 to $25,000,000.

—that about 2,000,000 fountain pen patents have been registered in the United States.

—and that practically all of them are worthless.

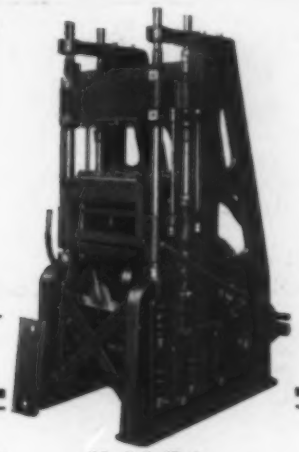
—that the fountain pen is 95% an American made article.

—that the fountain pen has ousted the old slate and pencil.

—that now-a-days, a child 6 years old is not too young to have a fountain pen.

—that casein plastics and pyroxylin materials are rapidly replacing hard rubber in the manufacture of fountain pens.

Mr. C. W. Rehor, employment manager of the Dupont-Viscoloid Company, recently spoke to a group of pupils at the Leominster high school on the subject of opportunities in the industrial field.



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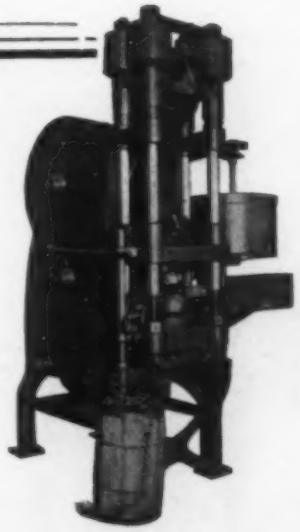
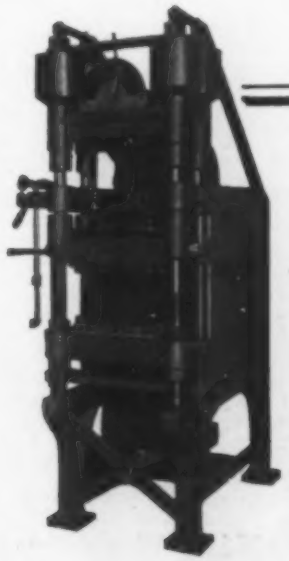


Model C-1



Model A-1

E-HYDRAULIC-ELMES
PRESSES PUMPS ACCUMULATORS
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Hydraulic Plastic Molding Equipment

PRESSES - PUMPS - ACCUMUTATORS - VALVES, ETC.
A complete line for the manufacturers of insulating parts
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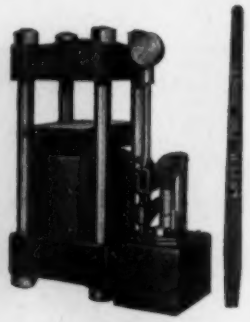
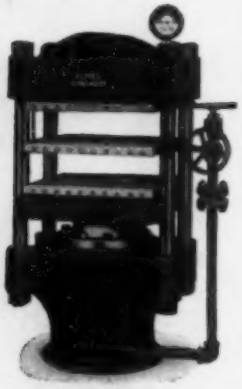
FLAT OR LAMINATED SHEETS, ETC.

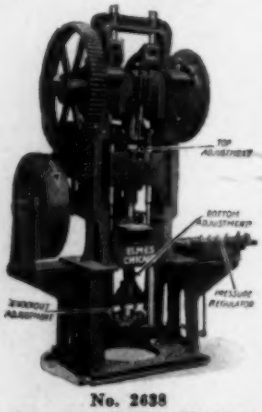


No. 319
Laboratory Testing and Forming Press. For Molding, we can Equip with Intermediate Hot Plates.

No. 2693
Patented Fool-Proof Control

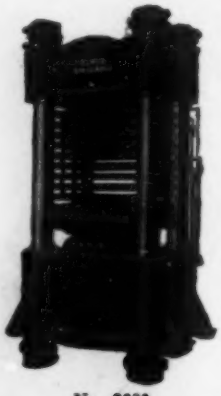


No. 2793
Heating and Chilling Unit Built to suit specifications.



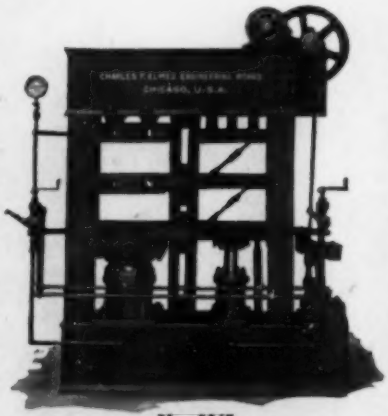
No. 2638
Automatic Tablet Machine for larger Sizes of Preforms From Powdered Materials.

Semi - Automatic Press No. 2693 is the only design of press where knockouts are returned without moving the press ram, or manipulating the valves. This patented feature permits reseating knockouts and die buttons without loss of time, and a maximum clearance for cleaning and refilling dies, which gives 10% to 20% greater output.



No. 2380
Heavy Duty Hot Plate Press Forged Steel Plates.

Automatic Tablet Machine No. 2638 is provided with Special form of Pressure Regulator adjustable to suit product and accommodate a variety of sizes in tablets. Uniform density assured in large preforms by application of pressure on both top and bottom of material. Can stop at any position of stroke.



No. 2247
Combination Heating and Chilling Unit

For MEDIUM and SMALL PLANTS we offer Self-contained Combination Heating and Chilling Unit No. 2247. The Plates are arranged for steam, gas, or electricity and cold water circulation. Portable Molds for transferring from Heating to Chilling Press. Automatic Cut-out permits operation of either press at will.

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Recent Trade Mark Applications

Ser. No. 213,759. Filed May 4, 1925. Acme White Lead & Color Works, Hamtramck, Mich. The word PROXLIN. For paint, enamels, paint and varnish thinners, and lacquers.

Ser. 222,429. Filed Oct. 28, 1925. Bakelite Corporation, New York. The word BAKELITE. For Candlesticks, Lamp Stands, bases and uprights; lamp shades; pendants and pulls for gas and oil lamps, and steam-radiator valve handles.

Ser. No. 214,468. Filed May 18, 1925. E. I. Du Pont de Nemours & Co., Wilmington, Del. An eliptical design consisting of the word **Du Pont** with the word **Duco** crossing the same. For polishes acting as dirt and grease removers and cleaning material.

Ser. No. 221,587. Filed Oct. 12,1925. Bakelite Corporation, New York, N. Y. The word BAKELITE. For safe combination knobs.

Ser. No. 221,858. Filed Oct. 16, 1925. Standard Varnish Works, New York, N. Y. The word STAND-LAC. For primers, paints, lacquers and the like, consisting more or less of pyroxylin or paint vehicle.

Ser. 226,235. Filed Jan. 22, 1926. The Egyptian Lacquer Co., New York. The word RAMESIAN. For lacquers, lacquer enamels and lacquer thinners.

Ser. No. 226,236. Filed Jan. 22, 1926. The Egyptian Lacquer Co., New York, N. Y. The word SPHYNX. For Lacquers, lacquer enamels and lacquer thinners.

Phonograph records and rosaries made from Bakelite now also carry the "infinity" trade mark, which, according to the Official Gazette of the U S. Patent Office was applied for on April 11, 1925.

The word *"Bakelite"* was protected as a registered trade mark for buttons and buckles, registration being filed Oct. 23, 1925.

Gelatin Plastics

(*Continued from page 192*)

cess to cellulose acetate plastics, and gives excellent results with gelatin, the articles having a high lustre when taken from the molds. The process is analogous to casting metals in that a mold is used, into which the softened gelatin is forced by extrusion from a heated chamber into the mold, which it fills completely, reproducing the finest lines of the same. When working with gelatin, the stuffing box should be heated to from 170 to 200 deg. C (338 to 392 deg. F), and it is also advisable to have the outlet of the same and the valve heated sufficiently to prevent the gelatin from freezing up at this point.

Waste Useable

A great advantage when working with gelatin as a plastic is that all of the waste material can be re-used, by the simple expedient of grinding and mixing with fresh material. To prevent access of moisture and a consequent softening of the molded gelatin articles, the same are covered with a protective coating of lacquer.

Molded gelatin plates and articles are characterized by nonflammability, great mechanical strength and fair electrical insulating value. They have found application (in Germany) for radio panels. Almost any color can be produced, and imitations of horn, tortoise shell, precious stone, jade, jet etc. are easily made.

The article concludes with methods for coating wooden objects with gelatin, using solutions, but this method does not involve operations which have a bearing on the utilization of gelatin as a truly thermoplastic material.

George H. Smith has been appointed Factory manager of the Southwark Foundry and Machine Co. of Philadelphia, Pa.

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PUMPS **PRESSES** VALVES

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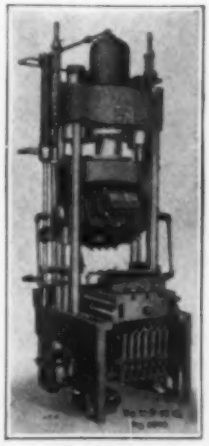

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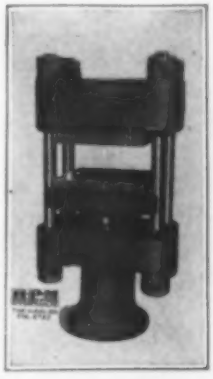
Every kind of molding work with all materials come within the range of the H-P-M Press line. It includes all types from a plain steam platen press for hand molds to FULL AUTOMATICS for quantity production, both of which are shown.



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TECHNICAL ABSTRACTS
AND PATENT REVIEW

MOLDING MATERIAL MADE FROM CELLULOSE ACETATE AND GLASS. Hermann Buchholz, U. S. Patent 1,568,955, Jan. 12, 1926.

A form of cellulose acetate called in the European trade "Lonarite or Cellon" is the base of the molding preparation which is suitable for shaping articles by the casting method. An excellent formula for producing results consists of 1000 parts of cellulose acetate, ninety parts of powdered glass, sixty parts of animal glue and fifteen parts of magnesite. The material and powdered glass are mixed in a rotating drum until in the form of a very fine powder. It can be introduced into a hopper and fed through an electrically heated cylinder which will render it sufficiently fluid to be forceable by a plunger directly into the molds which when opened will contain the perfectly shaped article.

DYEING CELLULOSE ACETATE. Rene Clavel, U. S. Patent 1,571,320, Feb. 2, 1926.

While primarily intended for cellulose acetate silk, the process is stated to be applicable to cellulose acetate film and plastics. It contains essentially in the use of developing dyes and the use of protective colloids in at least one of the baths used for the purpose.

TRANSPARENT INSOLUBLE PHENOL RESIN. A. Danilowitsch and Grigori Petrow. German Patent 418,198, applied for March 26, 1924.

The important point in the invention consists in the use of naphthalene-1-sulfonic acid as a catalyst, and in the presence of fusel oils (amyl alcohols) and glycerol during the condensation of phenol and formalhyde-yielding substances. The product is stated to be perfectly clear and transparent and suitable for the usual purposes for which phenol resins are employed.

MANUFACTURE OF ARTICLES FROM PAPER AND PHENOL RESINS. George A. E. Trombert, French Patent 590,756.

Paper is impregnated or coated on both sides with a solution of, or with molten phenol resin, and thereupon pressed in suitable molds into the desired form. The articles mentioned by the patentee are: battery boxes, electrical insulating material, vessels for chemical solutions, heat-insulators and ornamental ware.

SULFUR-PHENOL RESINS. Society for Chemical Industry of Basle, Switzerland. Swiss Patents 105,855, 105,856, 105,857 and 105,858.

Sulfur is condensed with such phenolic substances as beta-naphthol, pyrogallol, resorcinol or pyrocatechol in the presence of suitable catalysts.

CELLULOSE ESTER PLASTICIZERS. Societe Chimique des Usines du Rhone, France. French Patent 589,732.

Condensation products of ketones with poly-alcohols are used as plasticizers for cellulose esters or ethers. Specific examples are: acetone-glycerol and cyclohexanone-glycerol. The products are stated to be especially soft and pliable, and to possess high transparency.

METHOD OF SHAPING SHEET PYROXYLIN. Earl R. Person, assignor to the Viscoloid Co. U. S. Patent 1,573,356, Feb. 16, 1926.

This patent covers a method of molding sheet pyroxylin, which consists in cutting out of a flat sheet a blank thinner than the article to be produced, perforating it at exactly the margin at which perforations are desired in the completed product so as to leave the surfaces perpendicular to the flat surface of the blank sheet and so that the blank at all points will be rectangular in cross section, smoothing the surfaces of the perforated blank and pressing it between two surfaces, one of which is concave and deeper than the thickness of a blank to force all the material originally cut out to form the blank into the die, whereby all the material is utilized and the product is thicker than the sheet.

STRAIN INSULATION. Willard H. Kempton, assignor to Westinghouse Electric & Mfg. Co. U. S. Patent 1,572,937, Feb. 16, 1926.

A strain insulator comprising a hard molded insulating body having looped and twisted wires embedded therein. The insulator is built up of superimposed layers of sheet material impregnated with a hardened binder.

FORMING OPHTHALMIC MOUNTINGS. William J. Wrighton, assignor to American Optical Co. U. S. Patent 1,573,023, Feb. 16, 1926.

A process for shaping a celluloid part of an ophthalmic mounting comprising heating the part, bending it to a position beyond the required position and subjecting the bent part to heat until the bent part assumes the desired position through the action of the heat.

COMB. Albert H. Goshia. Toledo, O. U. S. Patent 1,575,201; March 2, 1926.

A comb comprising a relatively flat longitudinal body fashioned to provide a plurality of comb teeth, the body at the upper longitudinal edge therefor being transversly curved to provide an overhanging inverted U-shaped member, such U-shaped member being adapted to receive a curling iron to protect the operator while in the act of curling one's hair.

CASEIN — CELLULOSE ESTER PLASTICS. Eric Potter, English Patent 235,350.

Celluloid, cellulose acetate or cellulose ether plastics, in the form of sheets, are united with alternate sheets of casein plastics, the casein being hardened with formaldehyde in the usual manner. The union between the casein and the celluloid is brought about by moistening the cellulose with a camphor-alcohol solution, followed by heating the sheets under pressure.

PLASTIC MATERIAL FOR MAKING LENSES. H. Ramstetter and the Badische Aniline u. Soda-fabrik. German Patent 416,753, applied for Jan. 31, 1913. (thirteen years ago.)

Perfectly transparent condensation products of urea or urea derivatives and formaldehyde or formaldehye yielding substitutes are employed in place of quartz glass for the production of optical products such as camera and microscope lenses. (Cf. article on Pollopas, in the December, 1925, issue of Plastics. Ed.)

DETERMINATION OF PHENOL RESINS IN SOLUTION. A. L. Abonyi, Kunstsoffe, 1926, 16, 30-31.

The statement that phenol resins of the Bakelite type are volatile with alcohol vapors is stated to be incorrect. Attempts to determine the percentage of a phenol resin in solution by evaporating the solution give inaccurate results, as the heat required to remove all of the solvent leads to polymerization of the resin. Charts showing the loss in weight of phenol resin solutions when placed in a drying oven for varying periods are reproduced. Abonyi suggests a specific gravity determination as the best means for determining the true content of the solution in Phenol resin of the Bakelite A type, giving a table for reading off the percentage. As Bakelite A retains its specific gravity when in solution, no contraction takes place on solution. The percentage can then be calculated from the specific gravity of the solution. The name "Bakelometer" is suggested for a special hydrometer calibrated in percentage of Bakelite in alcoholic solution.

RECENT BOOKS

COMB MAKING IN AMERICA. An Account of the Origin and Development of the Industry for which Leominster has Become Famous. Compiled and Privately Printed for Bernard W. Doyle, President of the Viscoloid Co., Inc. in Commemoration of the One Hundred and Fiftieth Anniversary of the Founding of the Comb Industry in Leominster.

As the title indicates, this book is a labor of love, and in its every feature, from the elegant binding to the excellent printing and remarkably fine and numerous half-tones and cuts, speaks eloquently for the painstaking care involved in its preparation.

Primarily intended as a review of the development of comb-making from natural materials, especially horn, at Leominster, Mass., the volume gives an excellent account of the comb in the history of man-kind; followed by the description of the early comb plants and comb makers who introduced the industry into America.

It appears that comb making began with the efforts of Enoch Noyes, who worked in conjunction with a Hessian soldier whom the fortunes of war during the Revolution left stranded in America. Other famous early comb makers are taken up, such as the Sylvesters, the Chase factory, the Marshalls, other descendants of Noyes, and the Hills family.

The gradual evolution of the modern methods of horn-comb manufacturing are described in great detail, supported with a large number of very excellent illustrations. Early patents in this art, a chapter on the development of the horn substitutes, such as tortoise shell, ivory, casein and pyroxylin, and a history of the town of Leomister complete the book.

The typography and plate printing are considerably above the average and the paper is a cream-tinted heavy coated stock that serves to set off the illustrations to their best advantage.

According to the foreword, no effort has been spared to make this history exhaustive and accurate. Local histories, genealogies, and colonial publications, including books and newspapers have been consulted; and all persons who could throw any light upon the vanished comb industry, or furnish facts or reminiscences about an existing comb manufactory, have been freely sought out and interviews obtained.

The work was compiled and printed under the direction of Mr. Perry Walton, of Boston, from manuscript prepared by Miss Harriet E. O'Brien. Some of the research was conducted by Miss Frances Southard; the photographs are mostly by Mr. Hans Eberhard and the art work by Miss Cornelia Randall, all of the Walton staff. Mr. Doyle is to be congratulated upon this most excellent work, of which he is the sponsor.

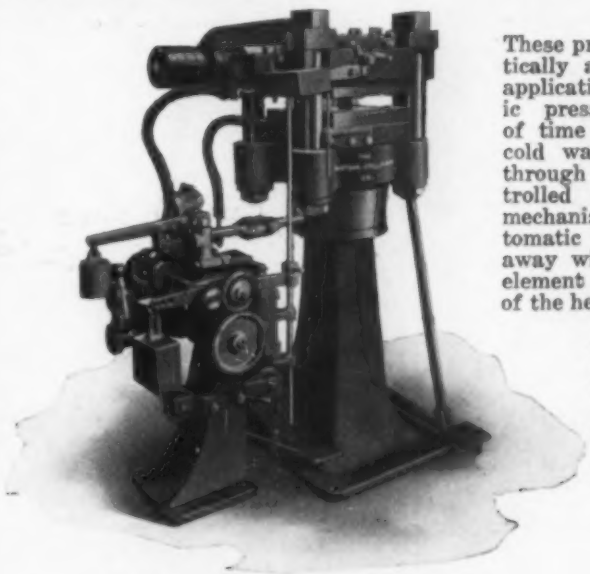
(*Continued on Page* 208)

WATSON-STILLMAN

Hydraulic Molding Presses

WITH TILTING HEAD

This press is designed primarily to increase the production and decrease labor in the operations involving the molding of plastic materials.



These presses are practically automatic; the application of hydraulic pressure, duration of time of steam and cold water circulation through the dies controlled by the valve mechanism. These automatic features do away with the human element in the timing of the heating and cooling of the dies, thereby insuring a uniformity as well as materially increasing production.

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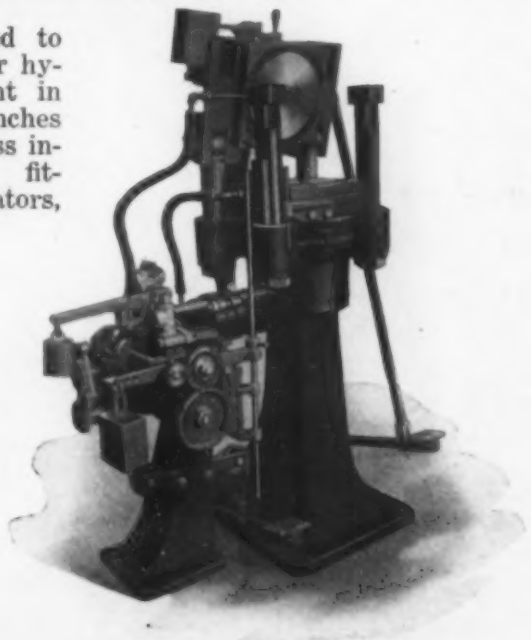

Showing Press with Tilting Head Open

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RECENT BOOKS

(*Continued from Page 207*)

PYROXYLIN ENAMELS AND LACQUERS. Their Raw Materials, Manufacture and Application. By Samuel P. Wilson, M. A. P. H. D., Van Nostrand Co., New York, 1925. $3.00. 207 pp. illustrated; index.

A virtual revolution has recently taken place in the field of paint and varnish. The words "lacquer" and "Duco" are on everyone's tongue, due, without doubt to the increasing popularity of these finishes on the automobiles. While it is generally known that pyroxylin is the base from which these lacquers are made up, there has been a dearth of authentic information upon this subject. Although Worden's Nitrocellulose Industry gives a most complete account of the subject of lacquers, it bears the date 1911, and much has happened in this field since. His more recent Volume 1 of Technology of Cellulose Esters carries the bibliography on the pyroxylin lacquer art down to 1920, but the projected volume dealing specifically with the solvents and lacquers has not as yet materialized.

For all of the above reasons the present volume by Dr. Wilson is all the more welcome. It fills a decided need in the industry, and, being well written, and sufficiently non-technical, it will be freely consulted by the army of workers who are invading this profitable field of lacquer manufacture.

Working Formulae

This book deals rather with the accepted facts and formulae relative to pyroxylin lacquers than with theory or a recital of patents and articles. For the lay reader this is a distinct advantage. The description of the commercial manufacture of pyroxylin is adequate and accurate, constituting chapter II. The solvents are taken up individually in chapter three and are described in sufficient detail so that the prospective lacquer maker may have all the necessary information when selecting a solvent for a given purpose. The diluents, or non-solvents, are likewise given due consideration.

Plasticizers and camphor substitutes, and the various gums and resins are comprised within chapters V

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and VI. In this connection the behavior of the resins in pyroxylin lacquers are taken up. This is an important part of the work, as very little information has been available on this point up to the present time.

As the present tendency is to use pyroxylin lacquers in place of paint, that is in the form of a material that leaves an opaque film, the question of pigments becomes important, and Dr. Wilson devotes chapter seven to the consideration of such products as have proven their value in lacquers; as for example zinc oxide, lithopone, titanium whites, bone black, Prussian blue and other pigements. To this is coupled a general discussion of pigments and the properties to be looked for.

Part two of the work deals with the preparation of the lacquers and bronzing liquids, as well as artificial leather dopes. This portion of the book is profusely illustrated with modern types of machinery used for compounding, clarifying and working of pyroxylin enamels.

A considerable number of definite formulae, stated to be used on actual working formulae, are given. Metal and wood lacquers and finally the lacquer enamels are taken up. The illustration for this section of the work comprise edge runner or chaser mills, stone mills, mixers, pebble mills, filter presses and the like.

The directions for preparing lacquer enamels of various colors are especially complete and should form a working basis for anyone contemplating the manufacture of these much sought after paint substitutes. The final chapters disclose the best accepted practice of the application of the lacquers by dipping, spraying and graining; closing with an account of usual analytical and control methods suitable for the supervision of manufacturing operations. The book is not encumbered with foot notes, all bibliographical references being relegated to the back of the volume. Patents have been entirely omitted. A short and concise index is provided.

A Real Contribution

In this connection it might be pointed out that there are quite a number of patents on the preparation of these enamels, and especially on the manufacture of the low viscosity cellulose nitrate that is en essential perrequisite for the successful manufacture of these products. No particular mention is made of the use of pyrxoylin plastic scrap for the preparation of lacquers, as this is a development that is just about in the incipient stages, and is being hedged about with numbers of patents recently issued, and still more pending.

The printing, paper and binding are excellent, and the comparatively low price at which the book is offered should insure a very large sale. It might be mentioned that Dr. Samuel P. Wilson was formerly research chemist for the Van Schaak Brothers Chemical Works, and technical director of the Royalin Flexible Lacquer Co., so that he is writing from actual experience—all of which enhances the value of his contribution to this rapidly growing industry.

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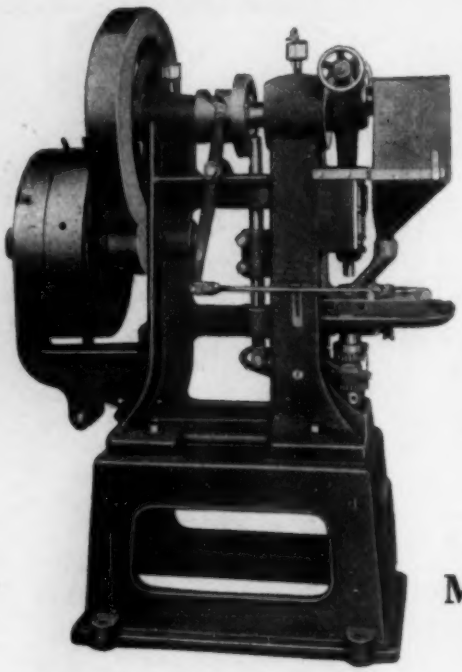

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Electrical Insulation

(*Continued from Page 191*)

its own favorite material. Among the better known cellulose acetate plasticizers are the substituted ureas, amides, sulfamides, anilides, esters of aromatic acids, esters of phosphoric acid, and certain aromatic ketones. As a general rule some solvent of cellulose acetate is also used in incorporating the plasticizers with the cellulose acetate. Such solvents are acetone, ethyl acetate and some special solvent mixtures. A. Eichengruen made an interesting discovery in this connection, and describes the same in his German Patent 254385. He found that certain solvent mixture, which, although they do not dissolve cellulose acetate when solid, will do so when hot. For example, the "Zellite" already mentioned is entirely insoluble in alcohol as well as benzene. In a mixture of these two solvents it is also insoluble when cold, but quite soluble when equal parts of alcohol and benzene are used hot.

Acetate Plastics

The solid solution resulting from the admixture or blending of cellulose acetate and plasticizers is commercially known as "Cellone" and is a celluloid-like material which is practically incombustible. It has unlimited industrial applications. Besides the cellulose acetate and pasticizers, pressed electrical insulation also contains fillers and coloring materials. One good way of mixing the cellulose acetate with the fillers is to use a solvent for the plasticizer as well as the acetate and to mix the resultant solution with the fillers and colors, afterwards removing the solvent and kneading and rolling the mixture, as is usual with the manufacture of celluloid.

In this case, however, and when attempting to afterwards mold such material, the presence of the incompletely removed solvent leads to some inconvenience. The following method has

hence been adopted with considerable success. A mixture of cellulose acetate, camphor-substitute, fillers and coloring matter is barely moistened with a solvent, and this material pressed in a pre-forming press into the general outline of the objects to be fabricated. This initial pressing, which in this case should be done hot, causes a gelatinization of the cellulose acetate. Alternatively, the material can first be pressed simply into sheets or other convenient form, and then ground to a fine powder, which is then used for molding in the orthodox manner as is phenol-resin and other molding powder. (See German Patent 393873).

Extrusion

The great plasticity of cellulose acetate allows of its use in the formation of objects by the so-called "spray" method. By suitable apparatus and heat the cellulose acetate mass can be sufficiently plasticized to allow of its extrusion from nozzles and can thus be forced against cold molds, which it will fill with complete reproduction of the finest details, and from which can be withdrawn as soon as cold.

In general it can be stated that the cellulose acetate plastics are superior to most phenol-resin products, although not infusible, because they can be produced much faster, especially by the extrusion or casting method, and because all the flash and waste from molding operations can be re-worked to advantage. Their inherent toughness also obviates the necessity of using fibrous fillers, and their light color is an added advantage. For all low-voltage work, and especially for parts of apparatus such as telephone and radio sets, they are especially valuable.

The three essential methods just described, while characteristic of the manufacture of molded electrical products, by no means exhaust the subject. There are a great many other types of material that give ex-

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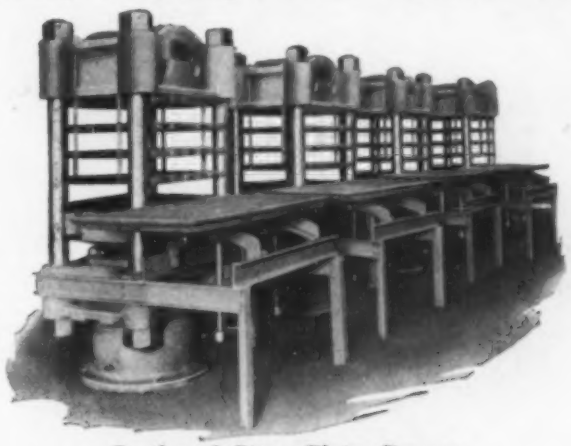

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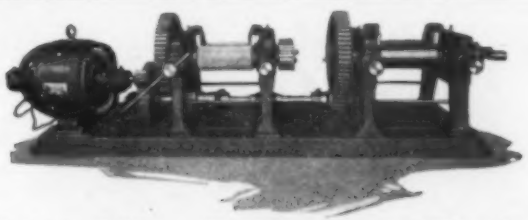

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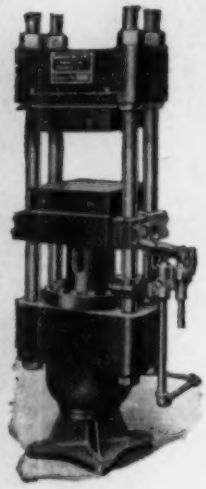

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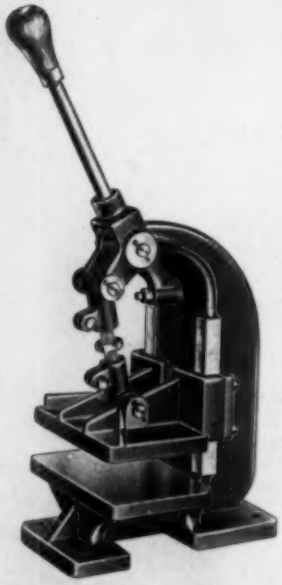

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cellent results. For example there are the other cellulose esters, as cellulose formate, and the more recent cellulose ethers, such as ethyl cellulose.

Vulcanized Fiber

There are also the many ceramic insulating materials, such as those made from a material known as "Steatite," and which are molded from soapstone and clay with suitable fluxes and afterwards burnt. The so-called vulcanized fiber products, which are made by the action of zinc chloride or sulfuric acid upon cellulose, also find wide application for insulating material. Due to their tendency to absorb moisture, their use is however limited to indoor use, such as for electric sockets and the like. The casein plastics, such as Galalith, may be used for insulating material, but not much is as yet known as to their application in this field.

Conciuslon

The fibrinous blood products made from blood-serum hardened with formaldehyde may also eventually be used for the manufacture of insulating material.

The main object to be attained in producing insulating materials, is to so balance the cost of production against the expected utilization of the material so as to produce the best economic result. It is evident that to use an expensive material for a cheap object of limited usefulness is just as poor management as to use the cheap material for an object that must withstand unlimited use and high voltages. The proper study of materials, as well as the mechanical means for mass-production, is a study well worth while to the insulation engineer.

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Pyroxylin in the shoe industry, and specifically the application of the Du Pont product, Pyralin, is the subject of an entertainingly written article by Henry Roe in the April, 1926, issue of the Du Pont Magazine. This versatile material is used in women's shoes for covering the heels, and in the form of buckles for their adornment. Counters, box toes, lace tips and eyelets also are covered with or treated with pyroxylin. The use of pyroxylin shoe buttons, and its general use as a waterproofing agent for footwear are brought out.

BOOKS

Synthetic Resins and their Plastics.

Carleton Ellis. 514 pages, illustrated. $6.00.

The book will serve as a guide and prove a stimulus to the numerous investigators and practitioners in the field of artificial resins. The section of plastic molding is especially valuable.

Plastics and Molded Electrical Insulation.

Emile Hemming. 313 pages. Illustrated. $5.00.

Very special care has been taken in the preparation of the chapter of molded insulation. Contains hundreds of references to plastic and composition products and their utilization.

Celluloid.

Its raw material, manufacture, properties and uses.

Dr. Fr. Bockmann. 188 pages. 69 illustrations. $3.50.

In this book, the raw product, cellulose and its properties are thoroughly described. Other raw materials and methods of rendering them more plastic also occupy attention.

Pyroxylin Enamels and Lacquers.

Samuel P. Wilson. 213 pages. Illustrated. $3.00.

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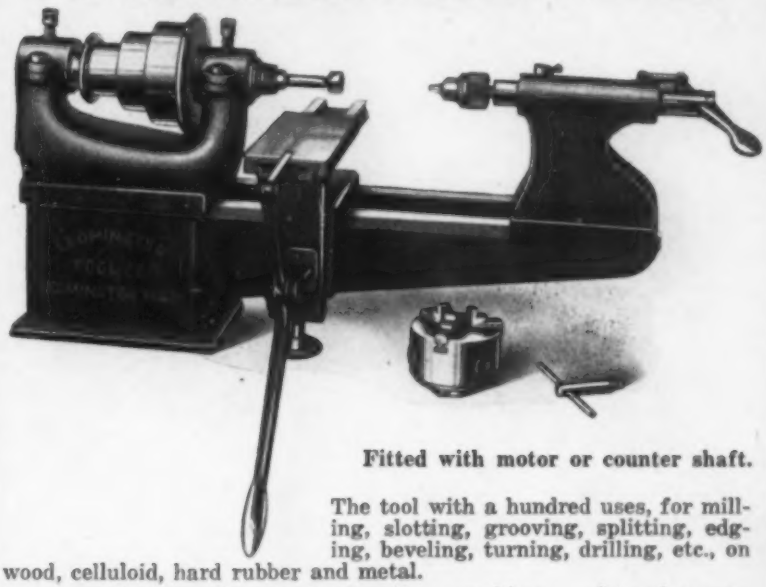

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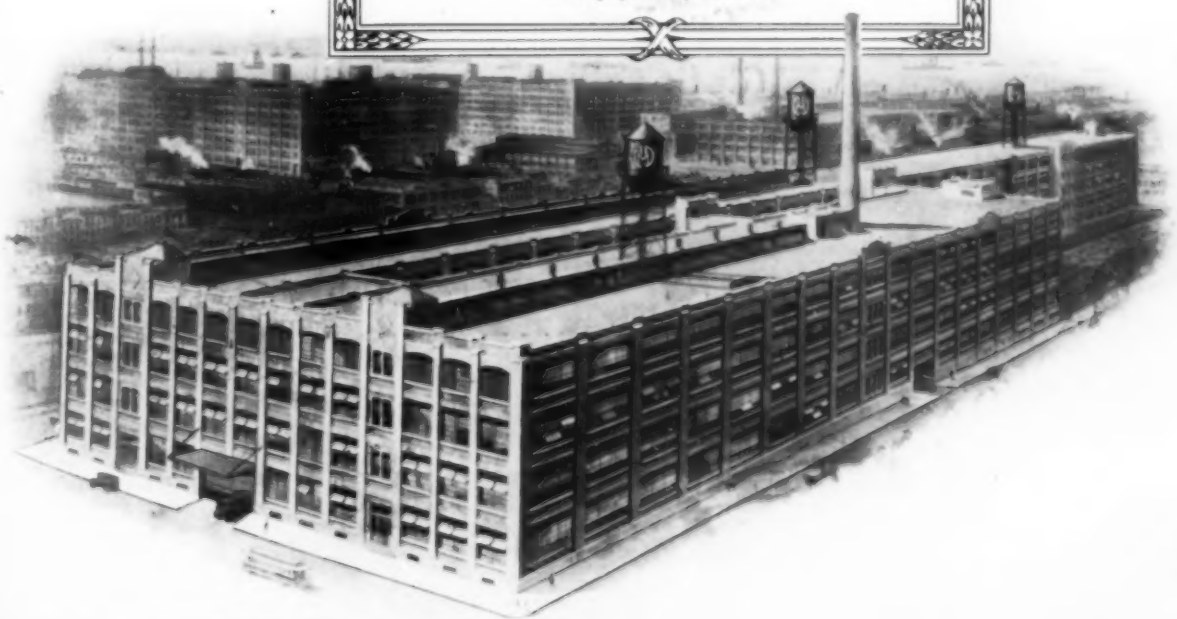

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